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10/620,685	07/17/2003	Akio Tajima	N03404US	9634

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MCGINN INTELLECTUAL PROPERTY LAW GROUP, PLLC
8321 OLD COURTHOUSE ROAD
SUITE 200
VIENNA, VA 22182-3817

EXAMINER	
LE, THI Q	

ART UNIT	PAPER NUMBER
2613	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/620,685	TAJIMA, AKIO	
	Examiner	Art Unit	
	Thi Q. Le	2613	

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12/04/2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-32* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-32* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *17 July 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

This Action is in response to Applicant's amendment filed on 5/21/2007. **Claims 1-32 are** still pending in the present application.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. **Claim 22** is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 22 recites the limitation "**The switching device**" in **line 1 of claim 22**. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. **Claims 1-7, 9-15, 19, and 21-24** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Chaudhuri et al. (US PGPub 2003/0170020)** and in view of **Fukashiro et al. (US PGPub 2005/0025481)**.

Consider **claim 1**, Chaudhuri clearly shows and discloses, a communication node comprising: at least one optical signal transmitting communication line to transmit an optical signal to said opposite communication node (figures 5 and 6 show bidirectional optical fibers are use to transfer optical signal between nodes A-D; paragraph 0041);

at least one optical signal receiving communication line to receive an optical signal from said opposite communication node (figures 5 and 6 show bidirectional optical fibers are use to transfer optical signal between nodes A-D; paragraph 0041);

a switching device including at least two bi-directional ports, (figures 5 shows optical layer cross connect, OLXC 505, located in node A has at least two bidirectional ports connected to interface equipment 510 which in turn is connected to optical fibers 520 and 525; paragraphs 0030-0032),

such that when no failure has occurred in said optical signal transmitting communication line and in said optical signal receiving communication line, an optical signal fed from said optical signal transmitting device to said optical signal transmitting communication line and to transmit an optical signal fed from said optical signal receiving communication line to said optical signal receiving device (figure 5 shows under normal optical signal transmission, OLXC 505 routes optical signal from optical fibers 520 and 525 to external port, loosely labeled 1 and 9, respectively; paragraphs 0030-0033),

when a failure has occurred in said optical signal transmitting communication line, said switching device switches so that said optical signal fed from said optical signal transmitting device is transmitted via one of said at least two bi-directional ports to said optical signal receiving communication line (figure 5 shows when the entire optical fiber 520 fails, OLXC 505 routes prioritized optical signals from external port, loosely labeled 1, to optical fiber 525; paragraphs 0038-0039), and

when a failure has occurred in said optical signal receiving communication line, said switching device switches so that said optical signal to be fed to said optical signal receiving device is received via an other of said at least two bi-directional ports from said optical signal transmitting communication line (Figure 5 shows the case of switching prioritized optical signals from optical fiber 520 to 525; it would have been obvious that when a failure occurs in optical fiber 525, prioritized optical signals will be switched to optical fiber 520; paragraphs 0038-0039),

wherein said transmitting and receiving communication lines comprise primary communication lines unreserved for exclusive communication when a failure has occurred in one of said transmitting and receiving communication lines (The hybrid protection architecture shown in figures 5 and 6 used multiple-line optical fiber connection for each link between nodes, but the protection scheme is not 1:1; i.e. both optical links are use for regular data communication; paragraphs 0029, 0046).

Chaudhuri discloses a typical optical fiber communication system comprises a combination of transmitters and receivers, but fails to specifically disclose, an optical signal transceiver having at least one optical signal transmitting device and at least one optical signal

receiving device to transmit and receive an optical signal to and from an opposite communication node; and said switching device being connected to said optical signal transmitting device and to said optical signal receiving device to transmit.

In related art, Fukashiro teaches the use of optical crossconnect in an optical transmission system. Wherein, the optical transmission includes, an optical signal transceiver having at least one optical signal transmitting device and at least one optical signal receiving device to transmit and receive an optical signal to and from an opposite communication node (figure 12A shows the optical transmission system includes optical transmitter/receivers 20-1 to 20-3; paragraphs 0084); and said switching device being connected to said optical signal transmitting device and to said optical signal receiving device to transmit (figures 12A shows, optical crossconnect 1-1 to 1-3 are connected to the optical transmitter/receiver 20-1 to 20-3; paragraph 0085).

It would have been obvious for a person of ordinary skill in the art at the time of the invention to incorporate the teachings of Fukashiro with Chaudhuri, because Fukashiro particularly shows the optical connections between OXC and optical transceivers. Further, Fukashiro provides optical transmission protection for low cost.

Consider **claim 2**, and **as applied to 1 above**, Chaudhuri modified by Fukashiro, further disclose, wherein wavelengths of optical signals transmitted from all said optical signal transmitting devices being placed in said optical signal transceiver are different from one another and from wavelengths of optical signals transmitted from said opposite communication node (it would have been obvious for a person of ordinary skill in the art to recognized, for bidirectional optical communication to occur within a signal optical fiber, the wavelength transmitted from either transmission end must be different from each other).

Consider **claim 3**, and **as applied to 1 above**, Chaudhuri modified by Fukashiro, further disclose, wherein said switching device includes an optical switch that enables an optical signal to be transmitted in bidirectional directions (Chaudhuri clearly discloses in figure 5 an OLXC 505; paragraph 0030).

Consider **claim 4**, Chaudhuri clearly shows and discloses, a communication node comprising: a plurality of optical signal communication lines to transmit and receive a optical signal between each of said optical signal transceivers and said opposite communication node (figure 5 shows optical fibers 520 and 525 are bidirectional optical fibers used for communicating optical signal between node A and B; paragraphs 0030-0032); and

a switching device including at least two bi-directional ports (figures 5 shows optical layer cross connect, OLXC 505, located in node A has at least two bidirectional ports connected to interface equipment 510 which in turn is connected to optical fibers 520 and 525; paragraphs 0030-0032),

when a failure has occurred in one of said plurality of said optical signal communication lines, said switching device switches so that an optical signal that had been transmitted through said one of said plurality of optical signal communication lines is transmitted in a multiplexed manner via one of said at least two bi-directional ports through another of said plurality of optical signal communication lines (figure 5 shows when the entire optical fiber 520 fails, OLXC 505 routes prioritized optical signals from external port, loosely labeled 1, to optical fiber 525; paragraphs 0038-0039),

wherein said plurality of optical signal communication lines comprise primary communication lines unreserved for exclusive communication when a failure has occurred in

said one of said plurality of said optical signal communication lines (The hybrid protection architecture shown in figures 5 and 6 used multiple-line optical fiber connection for each link between nodes, but the protection scheme is not 1:1; i.e. both optical links are use for regular data communication; paragraphs 0029, 0046).

Chaudhuri discloses a typical optical fiber communication system comprises a combination of transmitters and receivers, but fails to specifically disclose, a plurality of optical signal transceivers each having at least one optical signal transmitting device and at least one optical signal receiving device, which transmit and receive an optical signal to and from an opposite communication node; said switching device being connected to said optical signal transmitting device and to said optical signal receiving device.

In related art, Fukashiro teaches the use of optical crossconnect in an optical transmission system. Wherein, the optical transmission includes, an optical signal transceiver having at least one optical signal transmitting device and at least one optical signal receiving device to transmit and receive an optical signal to and from an opposite communication node (figure 12A shows the optical transmission system includes optical transmitter/receivers 20-1 to 20-3; paragraphs 0084); and said switching device being connected to said optical signal transmitting device and to said optical signal receiving device to transmit (figures 12A shows, optical crossconnect 1-1 to 1-3 are connected to the optical transmitter/receiver 20-1 to 20-3; paragraph 0085).

It would have been obvious for a person of ordinary skill in the art at the time of the invention to incorporate the teachings of Fukashiro with Chaudhuri, because Fukashiro particularly shows the optical connections between OXC and optical transceivers. Further, Fukashiro provides optical transmission protection for low cost.

Consider **claim 5**, and **as applied to 4 above**, Chaudhuri modified by Fukashiro, further disclose, wherein a wavelength of an optical signal that had been transmitted through an optical signal communication line in which a failure occurred is different from a wavelength of an optical signal that is transmitted through an optical signal communication line in which said optical signal is transmitted in a multiplexed manner when a failure occurs in said optical signal communication line (It would have been obvious for a person of ordinary skill in the art to recognized, for bidirectional optical communication to occur within a signal optical fiber, the wavelength transmitted from either transmission end must be different from each other).

Consider **claim 6**, and **as applied to 4 above**, claim 6 is rejected for the same reason as claim 3 above.

Consider **claim 7**, Chaudhuri clearly shows and discloses, a communication node being used in a ring-type network in which a plurality of said communication nodes is connected, comprising: a switching device including at least two bi-directional ports, said switching device being connected to one optical signal communication line connected to said one adjacent communication node, to an other optical signal communication line connected to said other adjacent communication node (figure 5 shows OLXC 585, located in node D is connected to optical fibers 570, 575 and 595, 598 which are connected to nodes C and A, respectively; paragraphs 0030-0032), which receives,

such that when no failure has occurred in said one optical signal communication line and in said other optical signal communication line, an optical signal sent from said one adjacent communication node from said one optical signal communication line and transmits it to said optical signal receiving device and transmits an optical signal to be transferred from said optical

signal transmitting device to said other adjacent communication node to said other optical signal communication line and relays an optical signal, when an optical signal fed from a communication node other than said one adjacent communication node making up said ring-type network is input from said other optical signal communication line to transfer it to said one optical signal communication line (figure 5 shows under normal optical signal transmission, OLXC 505 routes optical signal from optical fibers 520 and 525 to external port, loosely labeled 1 and 9, respectively; paragraphs 0030-0033),

when the failure has occurred in said one optical signal communication line, said switching device switches so that said optical signal fed from said one adjacent communication node is received from said other optical signal communication line via one of said at least two bi-directional ports and is transmitted to said optical signal receiving device and does switching, when the failure has occurred in said other optical signal communication line, so that said optical signal to be transferred from said optical signal transmitting device to said other adjacent communication node is transmitted via an other of said at least two bi-directional ports to said one optical signal communication line (figure 5 shows when the entire optical fiber 520 fails, OLXC 505 routes prioritized optical signals from external port, loosely labeled 1, to optical fiber 525; paragraphs 0038-0039),

wherein said one and said other of optical signal communication lines comprise primary communication lines unreserved for exclusive communication when a failure has occurred in one of said one and said other optical signal communication lines (The hybrid protection architecture shown in figures 5 and 6 used multiple-line optical fiber connection for each link between nodes,

but the protection scheme is not 1:1; i.e. both optical links are use for regular data communication; paragraphs 0029, 0046).

Chaudhuri discloses a typical optical fiber communication system comprises a combination of transmitters and receivers, but fails to specifically disclose, an optical signal transceiver having at least one optical signal transmitting device and at least one optical signal receiving device to receive an optical signal from one adjacent communication node and to transmit said optical signal to an other adjacent communication node; and said switching device being connected to said optical signal transmitting device and to said optical signal receiving device.

In related art, Fukashiro teaches the use of optical crossconnect in an optical transmission system. Wherein, the optical transmission includes, an optical signal transceiver having at least one optical signal transmitting device and at least one optical signal receiving device to transmit and receive an optical signal to and from an opposite communication node (figure 12A shows the optical transmission system includes optical transmitter/receivers 20-1 to 20-3; paragraphs 0084); and said switching device being connected to said optical signal transmitting device and to said optical signal receiving device to transmit (figures 12A shows, optical crossconnect 1-1 to 1-3 are connected to the optical transmitter/receiver 20-1 to 20-3; paragraph 0085).

It would have been obvious for a person of ordinary skill in the art at the time of the invention to incorporate the teachings of Fukashiro with Chaudhuri, because Fukashiro particularly shows the optical connections between OXC and optical transceivers. Further, Fukashiro provides optical transmission protection for low cost.

Consider **claim 9**, and **as applied to 7 above**, claim 9 is rejected for the same reason as claim 3 above.

Consider **claim 10**, Chaudhuri clearly shows and discloses, a communication node being used in a ring-type network in which a plurality of communication nodes is connected, said communication node comprising: at least one optical signal transmitting communication line to transmit an optical signal to said opposite communication node (figures 5 and 6 show bidirectional optical fibers are use to transfer optical signal between nodes A-D; paragraph 0041);

at least one optical signal receiving communication line to receive an optical signal from said opposite communication node (figures 5 and 6 show bidirectional optical fibers are use to transfer optical signal between nodes A-D; paragraph 0041);

a switching device including at least two bi-directional ports, (figures 5 shows optical layer cross connect, OLXC 505, located in node A has at least two bidirectional ports connected to interface equipment 510 which in turn is connected to optical fibers 520 and 525; paragraphs 0030-0032),

such that when no failure has occurred in said optical signal transmitting communication line and in said optical signal receiving communication line, an optical signal to be transferred from said one of said plurality of optical signal transmitting devices to said adjacent communication node to said optical signal transmitting communication line and receives an optical signal sent from said adjacent communication node from said optical signal receiving communication line and transmits it to said one of said plurality of optical signal receiving devices, (figure 5 shows under normal optical signal transmission, OLXC 505 routes optical

signal from optical fibers 520 and 525 to external port, loosely labeled 1 and 9, respectively; paragraphs 0030-0033),

when a failure has occurred in said optical signal transmitting communication line, said switching device switches so that an optical signal that had been transmitted from said one of said plurality of optical signal transmitting devices to said optical signal transmitting communication line is transmitted via one of said at least two bi-directional ports to said optical signal receiving communication line being connected similarly to said adjacent communication node to which said optical signal transmitting communication line had been connected and does switching, (figure 5 shows when the entire optical fiber 520 fails, OLXC 505 routes prioritized optical signals from external port, loosely labeled 1, to optical fiber 525; paragraphs 0038-0039), and

when a failure has occurred in said optical signal receiving communication line, said switching device switches so that an optical signal that had been received from said optical signal receiving communication line and had been transmitted to said one of said plurality of optical signal receiving devices is received via another of said at least two bi-directional ports from an optical signal transmitting communication line being connected similarly to said adjacent communication node to which said optical signal receiving communication line had been connected (Figure 5 shows the case of switching prioritized optical signals from optical fiber 520 to 525; it would have been obvious that when a failure occurs in optical fiber 525, prioritized optical signals will be switched to optical fiber 520; paragraphs 0038-0039),

wherein said transmitting and receiving communication lines comprise primary communication lines unreserved for exclusive communication when a failure has occurred in one

of said transmitting and receiving communication lines (The hybrid protection architecture shown in figures 5 and 6 used multiple-line optical fiber connection for each link between nodes, but the protection scheme is not 1:1; i.e. both optical links are use for regular data communication; paragraphs 0029, 0046).

Chaudhuri discloses a typical optical fiber communication system comprises a combination of transmitters and receivers, but fails to specifically disclose, an optical signal transceiver having a plurality of optical signal transmitting devices to transmit an optical signal to an adjacent communication node and a plurality of optical signal receiving devices to receive an optical signal from said adjacent communication node and to transmit and receive optical signals to and from both of said adjacent communication node; and said switching device being connected to one of said plurality of optical signal transmitting devices and to one of said plurality of optical signal receiving devices.

In related art, Fukashiro teaches the use of optical crossconnect in an optical transmission system. Wherein, the optical transmission includes, an optical signal transceiver having at least one optical signal transmitting device and at least one optical signal receiving device to transmit and receive an optical signal to and from an opposite communication node (figure 12A shows the optical transmission system includes optical transmitter/receivers 20-1 to 20-3; paragraphs 0084); and said switching device being connected to said optical signal transmitting device and to said optical signal receiving device to transmit (figures 12A shows, optical crossconnect 1-1 to 1-3 are connected to the optical transmitter/receiver 20-1 to 20-3; paragraph 0085).

It would have been obvious for a person of ordinary skill in the art at the time of the invention to incorporate the teachings of Fukashiro with Chaudhuri, because Fukashiro

particularly shows the optical connections between OXC and optical transceivers. Further, Fukashiro provides optical transmission protection for low cost.

The examiner take official notice that it would have been obvious to a person of ordinary skill in the art that the optical transmitters/receivers 20-1 to 20-3 may be modified to includes a plurality of transmitters and receivers. Since adding additional transmitter and receiver allow the system to communication using additional wavelengths; thus improving bandwidth capacity.

Consider **claim 11**, and **as applied to 10 above**, Chaudhuri modified by Fukashiro, further disclose, wherein wavelengths of optical signals to be transmitted from said optical signal transmitting device to said adjacent communication node are different from those of optical signals fed from said adjacent communication node (It would have been obvious for a person of ordinary skill in the art to recognized, for bidirectional optical communication to occur within a signal optical fiber, the wavelength transmitted from either transmission end must be different from each other).

Consider **claim 12**, and **as applied to 10 above**, claim 12 is rejected for the same reason as claim 3 above.

Consider **claim 13**, Chaudhuri clearly shows and discloses, a switching device including at least two bi-directional ports, said switching device configured to be connected to at least one piece of an optical signal transmitting communication line to transmit an optical signal to said opposite communication node, at least one piece of an optical signal receiving communication line to receive an optical signal from said opposite communication node (figures 5 shows optical layer cross connect, OLXC 505, located in node A has at least two bidirectional ports connected

to interface equipment 510 which in turn is connected to optical fibers 520 and 525; paragraphs 0030-0032), and

wherein, when no failure has occurred in said optical signal transmitting communication line and in said optical signal receiving communication line, an optical signal fed from said optical signal transmitting device is transmitted to said optical signal transmitting communication line and an optical signal fed from said optical signal receiving communication line is transmitted to said optical signal receiving device and wherein (figure 5 shows under normal optical signal transmission, OLXC 505 routes optical signal from optical fibers 520 and 525 to external port, loosely labeled 1 and 9, respectively; paragraphs 0030-0033),

when a failure has occurred in said optical signal transmitting communication line, switching is done so that said optical signal fed from said optical signal transmitting device is transmitted via one of said at least two bi-directional ports to said optical signal receiving communication line and (figure 5 shows when the entire optical fiber 520 fails, OLXC 505 routes prioritized optical signals from external port, loosely labeled 1, to optical fiber 525; paragraphs 0038-0039), when a failure has occurred in said optical signal receiving communication line, switching is done so that said optical signal to be fed to said optical signal receiving device is received via an other of said at least two bi-directional ports from said optical signal transmitting communication line (Figure 5 shows the case of switching prioritized optical signals from optical fiber 520 to 525; it would have been obvious that when a failure occurs in optical fiber 525, prioritized optical signals will be switched to optical fiber 520; paragraphs 0038-0039),

wherein said transmitting and receiving communication lines comprise primary communication lines unreserved for exclusive communication when a failure has occurred in one of said transmitting and receiving communication lines (The hybrid protection architecture shown in figures 5 and 6 used multiple-line optical fiber connection for each link between nodes, but the protection scheme is not 1:1; i.e. both optical links are use for regular data communication; paragraphs 0029, 0046).

Chaudhuri discloses a typical optical fiber communication system comprises a combination of transmitters and receivers, but fails to specifically disclose, a switching device being connected to an optical signal transceiver comprising at least one optical signal transmitting device and at least one optical signal receiving device to transmit and receive an optical signal to and from an opposite communication node and making up a communication node with said optical signal transceiver; said switching device configured to be connected to said optical signal transmitting device and said optical signal receiving device.

In related art, Fukashiro teaches the use of optical crossconnect in an optical transmission system. Wherein, the optical transmission includes, an optical signal transceiver having at least one optical signal transmitting device and at least one optical signal receiving device to transmit and receive an optical signal to and from an opposite communication node (figure 12A shows the optical transmission system includes optical transmitter/receivers 20-1 to 20-3; paragraphs 0084); and said switching device being connected to said optical signal transmitting device and to said optical signal receiving device to transmit (figures 12A shows, optical crossconnect 1-1′to 1-3 are connected to the optical transmitter/receiver 20-1 to 20-3; paragraph 0085).

It would have been obvious for a person of ordinary skill in the art at the time of the invention to incorporate the teachings of Fukashiro with Chaudhuri, because Fukashiro particularly shows the optical connections between OXC and optical transceivers. Further, Fukashiro provides optical transmission protection for low cost.

Consider **claim 14**, and **as applied to 13 above**, claim 14 is rejected for the same reason as claim 2 above.

Consider **claim 15**, and **as applied to 13 above**, claim 15 is rejected for the same reason as claim 3 above.

Consider **claim 19**, Chaudhuri clearly shows and discloses, a switching device including at least two bi-directional ports, said switching device configured to be connected one optical signal communication service line connected to said one adjacent communication node, to an other optical signal communication line connected to said other adjacent communication node, to said optical signal transmitting device and to said optical signal receiving device (figures 5 shows optical layer cross connect, OLXC 535, located in node b has at least two bidirectional ports connected to interface equipment 550, 540 which in turn is connected to optical fibers 520, 525 and 545, 550, respectively; paragraphs 0030-0032),

wherein, when no failure has occurred in said one optical signal communication line and in said other optical signal communication line, an optical signal fed from said one adjacent communication node is received from said one optical signal communication line and is transmitted to said optical signal receiving device and an optical signal to be transferred from said optical signal transmitting device to said other adjacent communication node is transmitted to said other optical signal communication line and, when an optical signal fed from a

communication node other than said one adjacent communication node making up said ring-type network is input from said adjacent optical signal communication line, said optical signal is relayed to transfer it to said one optical signal communication service line (figure 5 shows under normal optical signal transmission, OLXC 535 routes optical signal between optical fibers 520, 525 and 545, 550 , respectively; paragraphs 0030-0033),

when a failure occurs in said one optical signal communication service line, said switching device switches so that said optical signal fed from said one adjacent communication node is received through said other optical signal communication line via one of said at least two bi-directional ports and is transmitted to said optical signal receiving device and, when a failure has occurred in said other optical signal communication line, an optical signal to be transferred from said optical signal transmitting device to said other adjacent communication node is transmitted via an other of said at least two bi-directional ports to said one optical signal communication line (figure 5 shows when the entire optical fiber 520 fails, OLXC 535 routes prioritized optical signals to optical fiber 525; paragraphs 0038-0039),

wherein said one and said other of optical signal communication lines comprise primary communication lines unreserved for exclusive communication when a failure has occurred in one of said one and said other optical signal communication lines (The hybrid protection architecture shown in figures 5 and 6 used multiple-line optical fiber connection for each link between nodes, but the protection scheme is not 1:1; i.e. both optical links are use for regular data communication; paragraphs 0029, 0046).

Chaudhuri discloses a typical optical fiber communication system comprises a combination of transmitters and receivers, but fails to specifically disclose, a switching device

being connected to an optical signal transceiver having at least one optical signal transmitting device and at least one optical signal receiving device and receiving an optical signal from one adjacent communication node and transmitting an optical signal to an other adjacent communication node and making up a communication node of a ring-type network; said switching device configured to be connected to said optical signal transmitting device and to said optical signal receiving device.

In related art, Fukashiro teaches the use of optical crossconnect in an optical transmission system. Wherein, the optical transmission includes, an optical signal transceiver having at least one optical signal transmitting device and at least one optical signal receiving device to transmit and receive an optical signal to and from an opposite communication node (figure 12A shows the optical transmission system includes optical transmitter/receivers 20-1 to 20-3; paragraphs 0084); and said switching device being connected to said optical signal transmitting device and to said optical signal receiving device to transmit (figures 12A shows, optical crossconnect 1-1 to 1-3 are connected to the optical transmitter/receiver 20-1 to 20-3; paragraph 0085).

It would have been obvious for a person of ordinary skill in the art at the time of the invention to incorporate the teachings of Fukashiro with Chaudhuri, because Fukashiro particularly shows the optical connections between OXC and optical transceivers. Further, Fukashiro provides optical transmission protection for low cost.

Consider **claim 21**, and **as applied to 19 above**, claim 21 is rejected for the same reason as claim 3 above.

Consider **claim 22**, Chaudhuri clearly shows and discloses, a switching device including at least two bi-directional ports, said switching device configured to be connected to an optical

signal transmitting communication line to transmit an optical signal to said adjacent communication node, an optical signal receiving communication line to receive an optical signal from said adjacent communication node (figures 5 shows optical layer cross connect, OLXC 505, located in node A has at least two bidirectional ports connected to interface equipment 510 which in turn is connected to optical fibers 520 and 525; paragraphs 0030-0032),

wherein when no failure has occurred in said optical signal transmitting communication line and in said optical signal receiving communication line, an optical signal to be transferred from said optical signal transmitting device to said adjacent communication node is transmitted to said optical signal transmitting communication line and an optical signal fed from said adjacent communication node is received from said optical signal receiving communication line and is transmitted to said optical signal receiving device and (figure 5 shows under normal optical signal transmission, OLXC 505 routes optical signal from optical fibers 520 and 525 to external port, loosely labeled 1 and 9, respectively; paragraphs 0030-0033),

when a failure has occurred in said optical signal transmitting communication line, switching is done so that an optical signal that had been transmitted from said optical signal transmitting device to said optical signal transmitting communication line is transmitted via one of said at least two bi-directional ports to an optical signal receiving communication line being connected similarly to said adjacent communication node to which said optical signal transmitting communication service line had been connected (figure 5 shows when the entire optical fiber 520 fails, OLXC 505 routes prioritized optical signals from external port, loosely labeled 1, to optical fiber 525; paragraphs 0038-0039) and when a failure has occurred in said optical signal receiving communication line, switching is done so that an optical signal that had

been received from said optical signal receiving communication line and transmitted to said optical signal receiving device is received via an other of said at least two bi-directional ports from an optical signal transmitting communication line being connected similarly to said adjacent communication node to which said optical signal receiving communication line had been connected (Figure 5 shows the case of switching prioritized optical signals from optical fiber 520 to 525; it would have been obvious that when a failure occurs in optical fiber 525, prioritized optical signals will be switched to optical fiber 520; paragraphs 0038-0039),

wherein said transmitting and receiving communication lines comprise primary communication lines unreserved for exclusive communication when a failure has occurred in one of said transmitting and receiving communication lines(The hybrid protection architecture shown in figures 5 and 6 used multiple-line optical fiber connection for each link between nodes, but the protection scheme is not 1:1; i.e. both optical links are use for regular data communication; paragraphs 0029, 0046).

Chaudhuri discloses a typical optical fiber communication system comprises a combination of transmitters and receivers, but fails to specifically disclose, a switching device being connected to an optical signal transceiver having a plurality of optical signal transmitting devices to transmit an optical signal to adjacent communication nodes and a plurality of optical signal receiving devices to receive an optical signal from said adjacent communication nodes and to transmit and receive an optical signal to and from both of said adjacent communication nodes and making up a communication node of a ring-type network; said switching device configured to be connected to said plurality of said optical signal transmitting devices and said plurality of said optical signal receiving devices.

In related art, Fukashiro teaches the use of optical crossconnect in an optical transmission system. Wherein, the optical transmission includes, an optical signal transceiver having at least one optical signal transmitting device and at least one optical signal receiving device to transmit and receive an optical signal to and from an opposite communication node (figure 12A shows the optical transmission system includes optical transmitter/receivers 20-1 to 20-3; paragraphs 0084); and said switching device being connected to said optical signal transmitting device and to said optical signal receiving device to transmit (figures 12A shows, optical crossconnect 1-1 to 1-3 are connected to the optical transmitter/receiver 20-1 to 20-3; paragraph 0085).

It would have been obvious for a person of ordinary skill in the art at the time of the invention to incorporate the teachings of Fukashiro with Chaudhuri, because Fukashiro particularly shows the optical connections between OXC and optical transceivers. Further, Fukashiro provides optical transmission protection for low cost.

The examiner take official notice that it would have been obvious to a person of ordinary skill in the art that the optical transmitters/receivers 20-1 to 20-3 may be modified to includes a plurality of transmitters and receivers. Since adding additional transmitter and receiver allow the system to communication using additional wavelengths; thus improving bandwidth capacity.

Consider **claim 23**, and **as applied to 22 above**, claim 23 is rejected for the same reason as claim 11 above.

Consider **claim 24**, and **as applied to 22 above**, claim 24 is rejected for the same reason as claim 3 above.

4. **Claims 16-18** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Chaudhuri et al. (US PGPub 2003/0170020)** and in view of **Fukashiro et al. (US PGPub 2005/0025481)**.

Consider **claim 16**, Chaudhuri clearly shows and discloses, a switching device including at least one bi-directional port, said switching device configured to be connected to a plurality of optical signal communication lines to transmit and receive an optical signal between said optical signal transmitting device and said opposite communication node (figures 5 shows optical layer cross connect, OLXC 505, located in node A has at least two bidirectional ports connected to interface equipment 510 which in turn is connected to optical fibers 520 and 525; paragraphs 0030-0032),

wherein switching is done, when a failure occurs in any of said optical signal communication lines, so that an optical signal that had been transmitted through said optical signal communication service line in which said failure has occurred is transmitted via said at least one bi-directional port in a multiplexed manner through any other optical signal communication service lines (figure 5 shows when the entire optical fiber 520 fails, OLXC 505 routes prioritized optical signals from external port, loosely labeled 1, to optical fiber 525; paragraphs 0038-0039),

wherein said plurality of optical signal communication lines comprise primary communication lines unreserved for exclusive communication when a failure has occurred in said one of said plurality of said optical signal communication lines (The hybrid protection architecture shown in figures 5 and 6 used multiple-line optical fiber connection for each link between nodes, but the protection scheme is not 1:1; i.e. both optical links are use for regular data communication; paragraphs 0029, 0046).

Chaudhuri discloses a typical optical fiber communication system comprises a combination of transmitters and receivers, but fails to specifically disclose, a switching device being connected to a plurality of optical signal transceivers each having at least one optical signal transmitting device and at least one optical signal receiving device to transmit and receive an optical signal to and from an opposite communication node and making up a communication node with said plurality of optical signal transceivers; and said switching device configured to be connected to each said optical signal transmitting device, and each said optical receiving device

In related art, Fee discloses, a switching device (read as, optical switch 108a; figure 1) being connected to a plurality of optical signal transceivers (read as, facility 136a-c; figure 1) each having at least one optical signal transmitting device (read as, transmitter 112a; figure 1) and at least one optical signal receiving device (read as, receiver 118a; figure 1) to transmit and receive an optical signal to and from an opposite communication node and making up a communication node with said plurality of optical signal transceivers; said switching device configured to be connected to each said optical signal transmitting device, and each said optical signal receiving device (read as, optical switch 108a is connected to facility 136a; figure 1); and wherein switching is done, so that an optical signal that had been transmitted through said optical signal communication line in which said failure has occurred is transmitted in a multiplexed manner through any other optical signal communication lines (read as, optical signals were switched and multiplexed and transmitted through optical fiber 104; figure 1) (figure 1; column 4 lines 15-20; column 5 lines 7-19 and 45-50; column 4 lines 37-48; column 6 lines 15-20).

It would have been obvious for a person of ordinary skill in the art at the time of the invention to incorporate the teachings of Fee with Chaudhuri. Since it is well known that optical

signal are dropped or added at any particular nodes in a network; wherein the drop signal is received by an external or integrate receiver within the node, while the external or integrated transmitter add signal to the fiber. Further, it is obvious that there are transmitters and receivers at various nodes in the network so that signals can be drop and add. Also, protection switches are necessary to ensure link failure does not effect communications between nodes.

Consider **claim 17**, and **as applied to 16 above**, claim 17 is rejected for the same reason as claim 5 above.

Consider **claim 18**, and **as applied to 16 above**, claim 18 is rejected for the same reason as claim 3 above.

5. **Claims 8 and 20** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Chaudhuri et al. (US PGPub 2003/0170020)** and in view of **Fukashiro et al. (US PGPub 2005/0025481)** and further in view of **Tammela et al. (US Patent # 6,868,234)**.

Consider **claim 8**, and **as applied to 7 above**, Chaudhuri modified by Fukashiro disclosed the invention as described above, except for, wherein wavelengths of optical signals transmitted by all communication nodes making up said ring-type network are different from one another.

The examiner takes official notice that it would have been obvious for a person of ordinary skill in the art at the time of the invention to know that in order to prevent interference between different optical signals, the transmission wavelength for a plurality of optical sources are different from each other. Further, Tammela clearly shows a transmission ring network,

wherein each node receiving and transmit a different wavelength comparing to all other nodes in the right network (figure 3; column 3 lines 17-25).

Consider **claim 20**, and **as applied to 19 above**, claim 20 is rejected for the same reason as claim 8 above.

6. **Claims 8 and 20** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Sugawara et al. (US PGPub 2002/0044315)** and in view of **Chaudhuri et al. (US PGPub 2003/0170020)**.

Consider **claim 25**, Sugawara et al. clearly show and disclose, a switching device (read as, optical switching apparatus 1051-105n; figure 1) that transmits a plurality of external optical signals through a plurality of optical signal communication lines, comprising: a plurality of optical multiplexing and demultiplexing devices (read as, MUX and DMUX in figure 1) each corresponding to one of said plurality of optical signal communication lines and each device including an input and output port (read as, input and output ports of DMUX and MUX going into the switch; figure 1), wherein optical signals of different types are communicated between said input and output ports of different devices of said plurality of optical multiplexing and demultiplexing devices through one of said plurality of optical signal communication lines that corresponds to specific optical multiplexing and demultiplexing devices (read as, signal of different wavelengths are demultiplexed, pass to the switch; then sent to a multiplexer, and output from multiplexer to optical fiber; wherein the optical fibers are connected to other multiplexer and demultiplexer of another node; figure 1); and a plurality of optical switches (read as, optical switches 1051-105n; figure 1) that correspond to and communicates one of said plurality of external optical signals between said plurality of optical signal communication lines

and an input and output port of one of said specific optical multiplexing and demultiplexing devices (read as, the optical switches 1051-105n are located between communication lines 1001-1008, and MUX/DEMUX 1010-1017. Further switches 1051-105n performs switching of optical signal with in working fibers 1001-1004; figure 1), wherein when no failure has occurred in one of said plurality of optical signal communication lines, and when a failure has occurred in one of said plurality of optical signal communication lines, said one of said plurality of external optical signals is communicated to an input and output port of an other of said specific optical multiplexing and demultiplexing device (read as, the optical switches 1051-105n are located between communication lines 1001-1008, and MUX/DEMUX 1010-1017. Further switches 1051-105n performs switching of optical signal with in protection fibers 1005-1008, when a working fiber is broken; figures 1, 2); and wherein bidirectional communication are conducted through the input and output ports (read as, communications are conducted bidirectionally through MUX, DEMUX 1010-1017 and switches 1051-105n; figure 1) (title; abstract; figure 1, 2a-c; paragraphs 0069-0075).

Sugawara fails to disclose, wherein said plurality of optical signal communication lines comprise primary communication lines unreserved for exclusive communication when a failure has occurred in said one of said plurality of said optical signal communication lines.

In related art, Chaudhuri discloses a method and apparatus for capacity efficient restoration in an optical communication system. The optical communication system uses a multiple-line optical fiber connection for each link between nodes; wherein said plurality of optical signal communication lines comprise primary communication lines unreserved for exclusive communication when a failure has occurred in said one of said plurality of said optical

signal communication lines (The hybrid protection architecture shown in figures 5 and 6 used multiple-line optical fiber connection for each link between nodes, but the protection scheme is not 1:1; i.e. both optical links are use for regular data communication; paragraphs 0029, 0046).

It would have been obvious for a person of ordinary skill in the art at the time of the invention to incorporate the teachings of Sugawara with Chaudhuri, because the method and apparatus disclosed by Chaudhuri provides additional gain in link capacity; thus, resulting in a higher data transfer rate.

Consider **claim 26, and as applied to claim 25 above**, Sugawara as modified by Chaudhuri further disclose, wherein said input and output ports of said plurality of said optical multiplexing and demultiplexing devices transmit and receive optical signals of different wavelengths (Sugawara teaches, optical signals in fiber 1001-1008 consist of more than one wavelength, that is different than one another; figure 1, paragraph 0069).

Consider **claim 31**, Sugawara et al. clearly show and disclose, a switching device (read as, optical switching apparatus; title) that transmits an external optical signal through a ring-type network in which a plurality of optical signal communication lines are connected between adjacent communication nodes, comprising: a plurality of optical multiplexing and demultiplexing devices (read as, MUX and DMUX in figure 1) each corresponding to one of said plurality of optical signal communication lines and each device including an input and output ports (read as, input and output ports of DMUX and MUX going into the switch; figure 1), wherein optical signals of different types are communicated between said input and output ports of different devices of said plurality of optical multiplexing and demultiplexing devices through one of said plurality of optical signal communication line that corresponds to specific optical

multiplexing and demultiplexing devices (read as, signal of different wavelengths are demultiplexed, pass to the switch; then sent to a multiplexer, and output from multiplexer to optical fiber; wherein the optical fibers are connected to other multiplexer and demultiplexer of another node; figure 1); and a plurality of optical switches that correspond to and communicated one of said plurality of external optical signals between said plurality of optical signal communication lines and an input and output port of one of said specific optical multiplexing and demultiplexing devices when no failure has occurred in one of said plurality of optical signal communication lines (read as, the optical switches 1051-105n are located between communication lines 1001-1008, and MUX/DEMUX 1010-1017. Further switches 1051-105n performs switching of optical signal with in working fibers 1001-1004; figure 1), and when a failure has occurred in one of said plurality of optical signal communication lines, said one of said plurality of external optical signals is communicated to an input and output port of an other of said specific optical multiplexing and demultiplexing devices (read as, the optical switches 1051-105n are located between communication lines 1001-1008, and MUX/DEMUX 1010-1017. Further switches 1051-105n performs switching of optical signal within protection fibers 1005-1008, when a working fiber is broken; figures 1, 2), wherein bidirectional communications are conducted through the input and output ports (read as, communications are conducted bidirectionally through MUX, DEMUX 1010-1017 and switches 1051-105n; figure 1) (title; abstract; figure 1, 2a-c; paragraphs 0069-0075).

Sugawara fails to disclose, wherein said plurality of optical signal communication lines comprise primary communication lines unreserved for exclusive communication when a failure has occurred in said one of said plurality of said optical signal communication lines.

In related art, Chaudhuri discloses a method and apparatus for capacity efficient restoration in an optical communication system. The optical communication system uses a multiple-line optical fiber connection for each link between nodes; wherein said plurality of optical signal communication lines comprise primary communication lines unreserved for exclusive communication when a failure has occurred in said one of said plurality of said optical signal communication lines (The hybrid protection architecture shown in figures 5 and 6 used multiple-line optical fiber connection for each link between nodes, but the protection scheme is not 1:1; i.e. both optical links are use for regular data communication; paragraphs 0029, 0046).

It would have been obvious for a person of ordinary skill in the art at the time of the invention to incorporate the teachings of Sugawara with Chaudhuri, because the method and apparatus disclosed by Chaudhuri provides additional gain in link capacity; thus, resulting in a higher data transfer rate.

Consider **claim 32, and as applied to claim 31 above**, Sugawara as modified by Chaudhuri further disclose, wherein said input and output ports of said plurality of said optical multiplexing and demultiplexing devices transmit and receive optical signals of different wavelengths (Sugawara teaches, optical signals in fiber 1001-1008 consist of more than one wavelength, that is different than one another; figure 1, paragraph 0069).

7. **Claims 27 and 28** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Bortolini (US Patent # 6,813,408)** in view of **Sugawara et al. (US PGPub 2002/0044315)** and further in view of **Chaudhuri et al. (US PGPub 2003/0170020)**.

Consider **claim 27**, Bortolini clearly shows and discloses, a switching device that transmits a plurality of external optical signals through a plurality of optical signal

communication lines comprising: a plurality of first optical multiplexing and demultiplexing devices (read as, plurality of first (wavelength routing element) WRE 910, in figure 9a) each corresponding to one of said plurality of optical signal communication lines (read as, optical lines carrying optical signals 902 and 940; figure 9a) and including a first set of input and output ports (read as, port outputting signals O11-O43 WRE 910, in figure 9a) and a second set of input and output ports (read as, port receiving input 902 on WRE 910, figure 9a), wherein optical signals of different types (read as, distinct spectral band) are communicated between said first set of input and output ports and said second set of input and output ports, and wherein each of said second set of input and output ports are connected to said at least one of said plurality of optical signal communication lines corresponding to each of said plurality of first optical multiplexing and demultiplexing devices (read as, optical line carrying optical signal 901 is connected to WRE 910; figure 9a) (Figure 9a; column 13 line 31 – column 14 line 9); a plurality of second optical multiplexing and demultiplexing devices (read as, WRE 912; figure 9a) each including a third set of input and output ports (read as, port outputting optical signal 940; figure 9a) and a fourth set of input and output ports (read as, port receiving signal I11-I43; figure 9a), wherein optical signals of different types (read as, distinct spectral band) are communicated between said third set of input and output ports and said fourth set of input and output ports, wherein each of said third set of input and output ports are connected to at least one of said plurality of external optical signals (read as, port outputting optical signal 940 is also connected to optical line that carries the optical signal 940; figure 9a) (Figure 9a; column 13 line 31 – column 14 line 9).

Bortolini fails to disclose an optical switch between said plurality of optical signal communication lines and said plurality of second optical multiplexing and demultiplexing

devices, said optical switch corresponding to each of said plurality of second optical multiplexing and demultiplexing devices, wherein said fourth set of input and output ports of said plurality of second optical multiplexing and demultiplexing device being corresponding to said optical switch that communicates to said first set of input and output ports of a specified one of said plurality of first optical multiplexing and demultiplexing devices when no failure has occurred in one of said plurality of optical signal communication lines corresponding to said specified one of said plurality of first optical multiplexing and demultiplexing devices, and communicates from said fourth set of input and output ports of said plurality of second optical multiplexing and demultiplexing devices to a first set of input and output ports of an other said plurality of first optical multiplexing and demultiplexing device when a failure has occurred in said one of said plurality of optical signal communication lines; wherein bidirectional communications are conducted through the input and output ports; and wherein said plurality of first and second optical signal communication lines comprise primary communication lines unreserved for exclusive communication when a failure has occurred in said one of said first and second plurality of said optical signal communication lines.

In related art, Sugawara et al. disclose, an optical switch between said plurality of optical signal communication lines and said plurality of second optical multiplexing and demultiplexing devices , said optical switch corresponding to each of said plurality of second optical multiplexing and demultiplexing devices (read as, optical switch 1051-105n are between optical communication lines 1003, 1004, 1007, 1008 and MUX/DEMUX 1010, 1011, 1014, 1015; figure 1), wherein said fourth set of input and output ports of said plurality of second optical multiplexing and demultiplexing device being corresponding to said optical switch that

communicates to said first set of input and output ports of a specified one of said plurality of first optical multiplexing and demultiplexing devices when no failure has occurred in one of said plurality of optical signal communication lines corresponding to said specified one of said plurality of first optical multiplexing and demultiplexing devices (read as, MUX/DEMUX 1010, 1011, 1014, 1015 input and output ports are connected to optical switch 1051-105n; optical switches are connected to input and output ports of MUX/DEMUX 1012, 1013, 1016, 1017. Wherein optical signal are transferred through the configuration bidirectionally; figure 1) (paragraph 0069-0071), and communicates from said fourth set of input and output ports of said plurality of second optical multiplexing and demultiplexing devices to a first set of input and output ports of an other said plurality of first optical multiplexing and demultiplexing device when a failure has occurred in said one of said plurality of optical signal communication lines (read as, the optical switches 1051-105n are located between communication lines 1001-1008, and MUX/DEMUX 1010-1017. Further switches 1051-105n performs switching of optical signal within protection fibers 1005-1008, when a working fiber is broken; figures 1, 2), Wherein bidirectional communications are conducted through the input and output ports (read as, communications are conducted bidirectionally through MUX, DEMUX 1010-1017 and switches 1051-105n; figure 1) (title; abstract; figure 1, 2a-c; paragraphs 0069-0075.

It would have obvious for a person of ordinary skill in the art at the time of the invention to incorporate the teaching of Sugawara et al. with Bortolini. Since for an optical network to reliable in the event of a failure, of components or optical fibers, then it is necessary to be able to have a plurality of optical fibers along with switching capabilities. So that in an event there are

failures within the network, the transmission path can be switch to another path easily and quickly.

In related art, Chaudhuri discloses a method and apparatus for capacity efficient restoration in an optical communication system. The optical communication system uses a multiple-line optical fiber connection for each link between nodes; wherein said plurality of optical signal communication lines comprise primary communication lines unreserved for exclusive communication when a failure has occurred in said one of said plurality of said optical signal communication lines (The hybrid protection architecture shown in figures 5 and 6 used multiple-line optical fiber connection for each link between nodes, but the protection scheme is not 1:1; i.e. both optical links are use for regular data communication; paragraphs 0029, 0046).

It would have been obvious for a person of ordinary skill in the art at the time of the invention to incorporate the teachings of Bortolini with Chaudhuri, because the method and apparatus disclosed by Chaudhuri provides additional gain in link capacity; thus, resulting in a higher data transfer rate.

Consider **claim 28, and as applied to claim 27 above**, Bortolini as modified by Sugawara et al. further disclose, wherein said first set of input and output ports of said plurality of first optical multiplexing and demultiplexing devices communicate optical signals of different wavelengths (read as, WRE 910 receiving optical signal 902 with a plurality of distinct spectral bands; Bortolini, figure 9a) and said third set of input and output ports of said plurality of second optical multiplexing and demultiplexing devices communicate optical signals of different wavelengths (read as, WRE 912 outputting optical signal 940 with a plurality of distinct spectral bands; Bortolini, figure 9a) (Bortolini; Figure 9a; column 13 line 31 – column 14 line 9)).

8. **Claims 29 and 30** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Sugawara et al. (US PGPub 2002/0044315)** in view of **Yamashita et al. (US Patent # 5,675,676)** and further in view of **Chaudhuri et al. (US PGPub 2003/0170020)**..

Consider **claim 29**, Sugawara et al. disclose, a switching device (read as, optical switching apparatus) connected between two optical signal communication lines making up a ring-type network for transmitting an external optical signal through said ring-type network, comprising: two optical multiplexing and demultiplexing devices (read as, MUX and DMUX 1010-1017 in figure 1) each being placed so as to correspond to each of said two optical signal communication lines and each of said two devices including a first set of input and output ports (read as, MUX/DEMUX 1010-1017 ports' that are connected to optical switch 1051-105n; figure 1) and a second set of input and output ports (read as, MUX/DEMUX 1010-1017 ports' that are connected to optical fiber 1001-1008; figure 1), wherein optical signals of different types are communicated between said first set of input and output ports and said second set of input and output ports (read as, optical signal with a plurality of wavelength are communicated through the apparatus; figure 1), and wherein two optical signal communication lines corresponding to each of said two optical multiplexing and demultiplexing devices are connected to said second set of input and output port (read as, signal of different wavelengths are demultiplexed, pass to the switch; then sent to a multiplexer, and output from multiplexer to optical fiber) (figure 1 and 2a; paragraph 0069-0071); and a plurality of optical switches that correspond to and communicates said external optical signal between said two optical signal communication lines and said two optical multiplexing and demultiplexing devices, wherein when no failure has occurred in one of said two optical signal communication lines connected to said two optical multiplexing and

demultiplexing devices, an external optical signal corresponding to each of said optical switches is input to a first set of input and output ports of each of said two optical multiplexing and demultiplexing devices (read as, the optical switches 1051-105n are located between communication lines 1001-1008, and MUX/DEMUX 1010-1017. Further switches 1051-105n performs switching of optical signal with in working fibers 1001-1004; figure 1), and when a failure has occurred in said one of said two optical signal communication lines, said external optical signal is input to a first set of input and output ports of each of said two optical multiplexing and demultiplexing devices corresponding to an other one of said two optical signal communication lines read as, the optical switches 1051-105n are located between communication lines 1001-1008, and MUX/DEMUX 1010-1017. Further switches 1051-105n performs switching of optical signal within protection fibers 1005-1008, when a working fiber is broken; figures 1, 2), wherein bidirectional communications are conducted through the input and output ports (read as, communications are conducted bidirectionally through MUX, DEMUX 1010-1017 and switches 1051-105n; figure 1) (title; abstract; figure 1, 2a-c; paragraphs 0069-0075).

Sugawara et al. fail to disclose, wherein said first set of input and output ports be connected to one another; and wherein said two of optical signal communication lines comprise primary communication lines unreserved for exclusive communication when a failure has occurred in at least one of said two optical signal communication lines.

In related art, Yamashita et al. disclose an optical branching apparatus. Wherein, one of the outputs from a multiplexing and demultiplexing unit is connection to one of the inputs of another multiplexing and demultiplexing unit. This arrangement has the purpose of allowing

transmission path rerouting in the event of a failure, but without the use of an optical switch (figure 1; column 1 lines 1-43).

It would have obvious for a person of ordinary skill in the art at the time of the invention to incorporate the teaching of Yamashita et al. with Sugawara et al. Since, the possibility of a switch failing is there; if the switch fails then there are no other means for rerouting transmission path. Thus, if there are optical fibers connection between each multiplexing and demultiplexing units within a node, then when the switch fail, the signal can be rerouted using the optical fibers.

In related art, Chaudhuri discloses a method and apparatus for capacity efficient restoration in an optical communication system. The optical communication system uses a multiple-line optical fiber connection for each link between nodes; wherein said plurality of optical signal communication lines comprise primary communication lines unreserved for exclusive communication when a failure has occurred in said one of said plurality of said optical signal communication lines (The hybrid protection architecture shown in figures 5 and 6 used multiple-line optical fiber connection for each link between nodes, but the protection scheme is not 1:1; i.e. both optical links are use for regular data communication; paragraphs 0029, 0046).

It would have been obvious for a person of ordinary skill in the art at the time of the invention to incorporate the teachings of Bortolini with Chaudhuri, because the method and apparatus disclosed by Chaudhuri provides additional gain in link capacity; thus, resulting in a higher data transfer rate.

Consider **claim 30, and as applied to claim 29 above**, Sugawara et al. as modified by Yamashita et al. further disclose, wherein said input and output ports of said plurality of said optical multiplexing and demultiplexing devices transmit and receive optical signals of different

wavelengths (read as, optical signal with a plurality of wavelength are communicated through the apparatus; Sugawara, figure 1, title; abstract; figure 1, 2a-c; paragraphs 0069-0075).

Conclusion

9. Any response to this Office Action should be **faxed to** (571) 273-8300 **or mailed to**:

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Alexandria, VA 22314

10. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Thi Le whose telephone number is (571) 270-1104. The Examiner can normally be reached on Monday-Friday from 7:30am to 5:00pm.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Rafael Perez-Gutierrez can be reached on (571) 272-7915. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist/customer service whose telephone number is (571) 272-2600.

Thi Le

KENNETH VANDERPUYE
SUPERVISORY PATENT EXAMINER